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markable confirmation in the doubly-refracting structure which the author discovered in chabasie; and they also enable us to understand the nature of that influence which heat produces on doubly-refracting crystals, as discovered by Prof. Mitscherlich. The optical phenomena exhibited by fluids under the influence of heat and pressure, and by crystals exposed to compressing or dilating forces, are also in perfect conformity with the above views, and would in themselves have been sufficient to establish the principle that the forces of double refraction are not resident in the molecules themselves, but are the immediate result of those mechanical forces by which these molecules constitute solid bodies.

*Experiments on the Influence of the Aurora Borealis on the Magnetic Needle.* By the Rev. James Farquharson, F.R.S. Minister of Alford, Aberdeenshire. In Letters addressed to Captain Edward Sabine, Sec. R.S. Read January 28, March 4, and April 1, 1830. [*Phil. Trans.* 1830, p. 97.]

In the first letter, dated from Alford, Dec. 15, 1829, the author gives a description of the instrument which was furnished to him by the Royal Society for measuring the variation of the magnetic needle, and also the magnetic intensity; and of his mode of using it. The needle was so delicately suspended as to render changes in the declination as small as  $10''$  very sensible. In his experiments on the magnetic intensity, the intervals of time occupied in the needle's performing 50 oscillations, commencing with an arc of  $12^\circ$ , were noted by a stop-watch, in which the stop, being applied on the balance, is instantaneous in its operation. The watch is again released from the stop at the commencement of a new observation; thus compensating, on the principle of the repeating circle, for any inaccuracy in the reading off, or any inequality in the divisions of the dial-plate.

The observations made on an Aurora borealis which appeared on the night of the 14th of December, are particularly detailed. On that occasion, the disturbance of the magnetic declination was so great, and so frequently changing from east to west, and the reverse, as to leave no doubt in the mind of the author of the reality of this influence. The needle, however, was affected at those times only when the fringes of the aurora were in such a position as to include the needle in their planes. It appeared to him, also, that the side towards which the needle declined, was the quarter where the aurora gave out the most vivid light.

His experiments on the oscillations of the needle have not yet enabled him to determine satisfactorily, whether any change of magnetic intensity accompanied these changes of direction.

In a second letter, dated December 26, he gives the results of later observations. From a comparison of his own with the observations of the Rev. James Paull, minister of Tullynessle, he infers that the height of the particular aurora which was seen by them on the 20th, did

not at its upper extremities exceed 4000 feet above the ground ; and is led to the general conclusion, that the aurora borealis is situated in the region immediately above the clouds, and therefore varies much in height according to the different states of the atmosphere. He believes it to be an effect of the developement of electricity from the condensation of vapour. The position of the fringes, which are constantly at right angles to the magnetic meridian, their progressive movements from the north magnetic pole, and their influence on the needle whenever they come into the plane of the dip, are all of them circumstances which establish the relation of this phenomenon to magnetism ; while they at the same time illustrate the intimate connexion subsisting between magnetism and electricity.

*Remarks on several Icebergs which have been met with in unusually low Latitudes in the Southern Hemisphere. By Captain James Horsburgh, Hydrographer to the East India Company, F.R.S. Read February 4, 1830. [Phil. Trans. 1830, p. 117.]*

The journals of the ships belonging to the East India Company, the author observes, during the whole of the last century, contain no accounts of icebergs having been seen in the course of their navigation in the southern hemisphere, although several of these ships proceeded into the parallels of latitude  $40^{\circ}$ ,  $41^{\circ}$ , and  $42^{\circ}$  south ; but during the last two years, it appears that icebergs have occasionally been met with by several ships in their passage, very near the Cape of Good Hope, between the latitudes of  $36^{\circ}$  and  $39^{\circ}$ . The particulars relating to these observations are detailed in the paper. The most remarkable occurred in the voyage of the brig *Eliza*, from Antwerp, bound to Batavia, which on the 28th of April, 1828, fell in with five icebergs in latitude  $37^{\circ} 31'$  south, longitude  $18^{\circ} 17'$  east of Greenwich. They had the appearance of church steeples, of a height from 250 to 300 feet ; and the sea broke so violently against these enormous masses, that it was at first suspected they might be fixed upon some unknown shoal, until, on sounding, no bottom could be discovered.

It is remarkable that in general, icebergs appear to be met with in low latitudes, nearly at the same period of the year, namely, in April or May, in both the northern and southern hemispheres, although the seasons are reversed in these two divisions of the globe. In order to account for the origin and accretion of the southern icebergs, the author thinks it probable that there exists a large tract of land near the antarctic circle, somewhere between the meridian of London and the twentieth degree of east longitude ; whence these icebergs have been carried in a north and north-north-easterly direction, by the united forces of current, winds, and waves, prevailing from south-south-west and south-west. Bouvet's and Thompson's Islands are not of sufficient magnitude, and Sandwich Land and Kerguelen's Island are too remote to be the source of the icebergs lately observed in the vicinity of the Cape. From their unprecedented descent during the